



Literature Report

NANO LETTERS

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Letter

A pH-Reversible Fluorescent Probe for *in Situ* Imaging of Extracellular Vesicles and Their Secretion from Living Cells

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Cite This: *Nano Lett.* 2021, 21, 9224–9232



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Date: 2021-11-18

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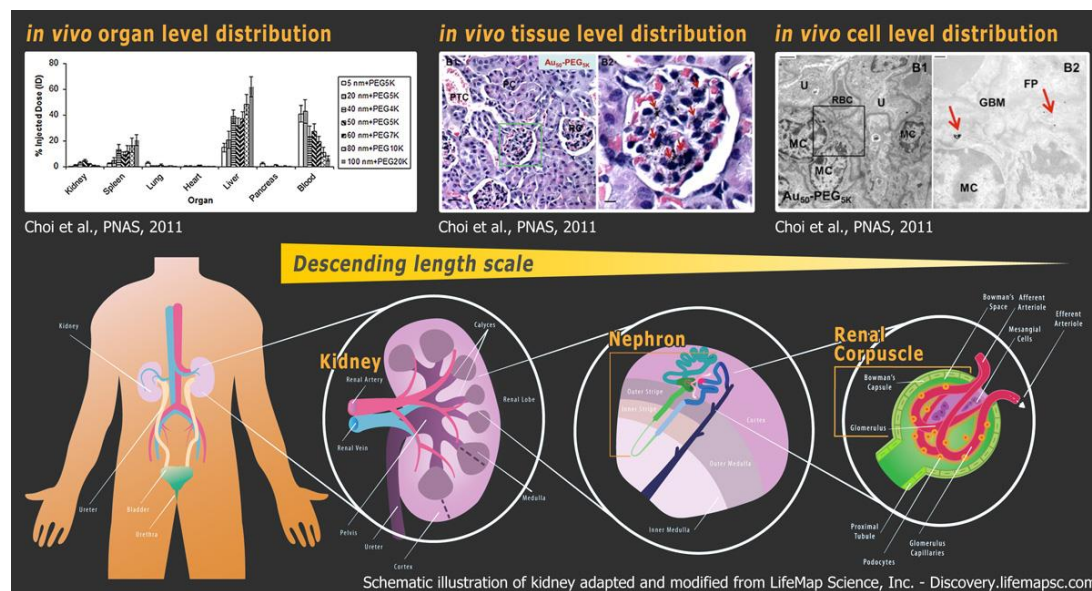
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Current research interests: nanomedicine, "bio-nano" interactions, non-cationic bionanomaterials



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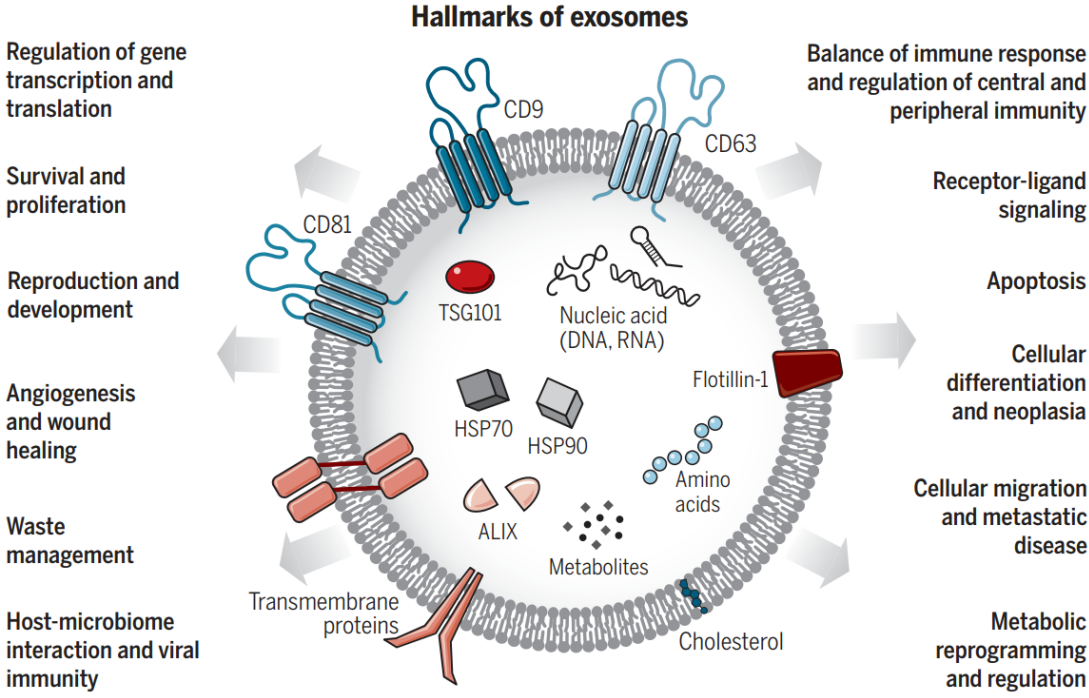
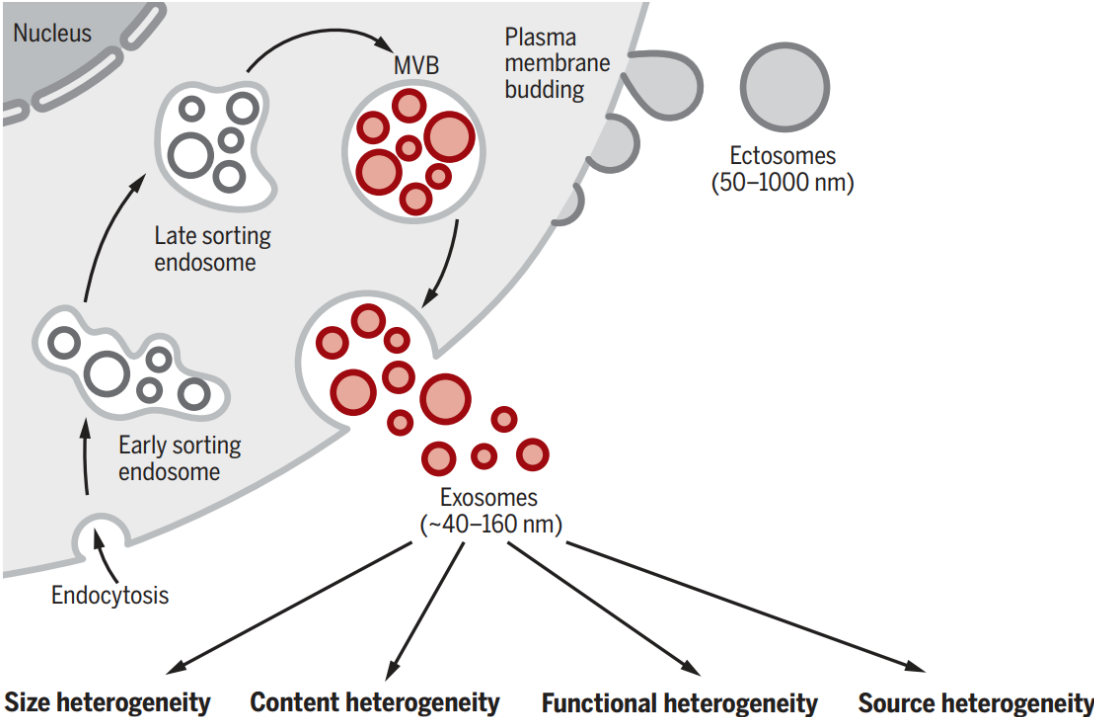
解析纳米颗粒与器官、组织和细胞的生物结构之间的基本相互作用

研究方向包括:

1. 基于卟啉衍生物的结构修饰、光谱性质、芳香性、自旋电子学性质以及理论计算;
2. 基于荧光二吡咯亚甲基的氟硼配合物的动态响应小分子探针的设计合成、活细胞成像剂和肿瘤的光动力治疗方面的应用。

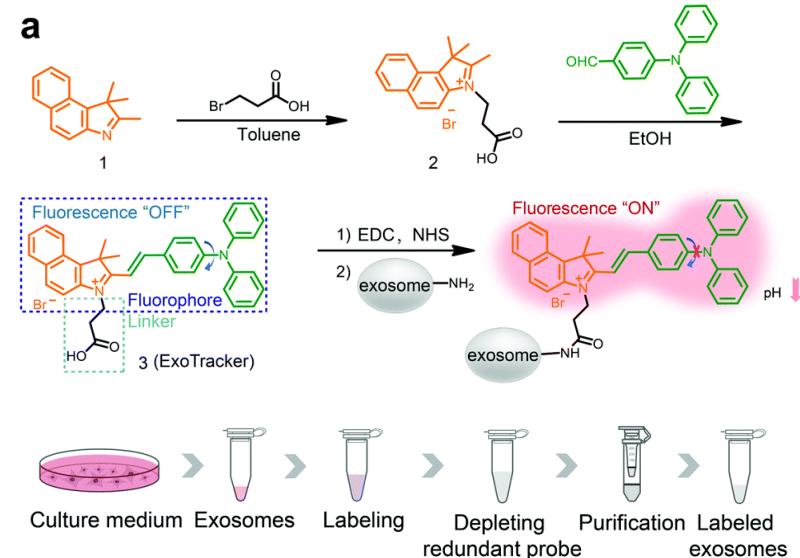
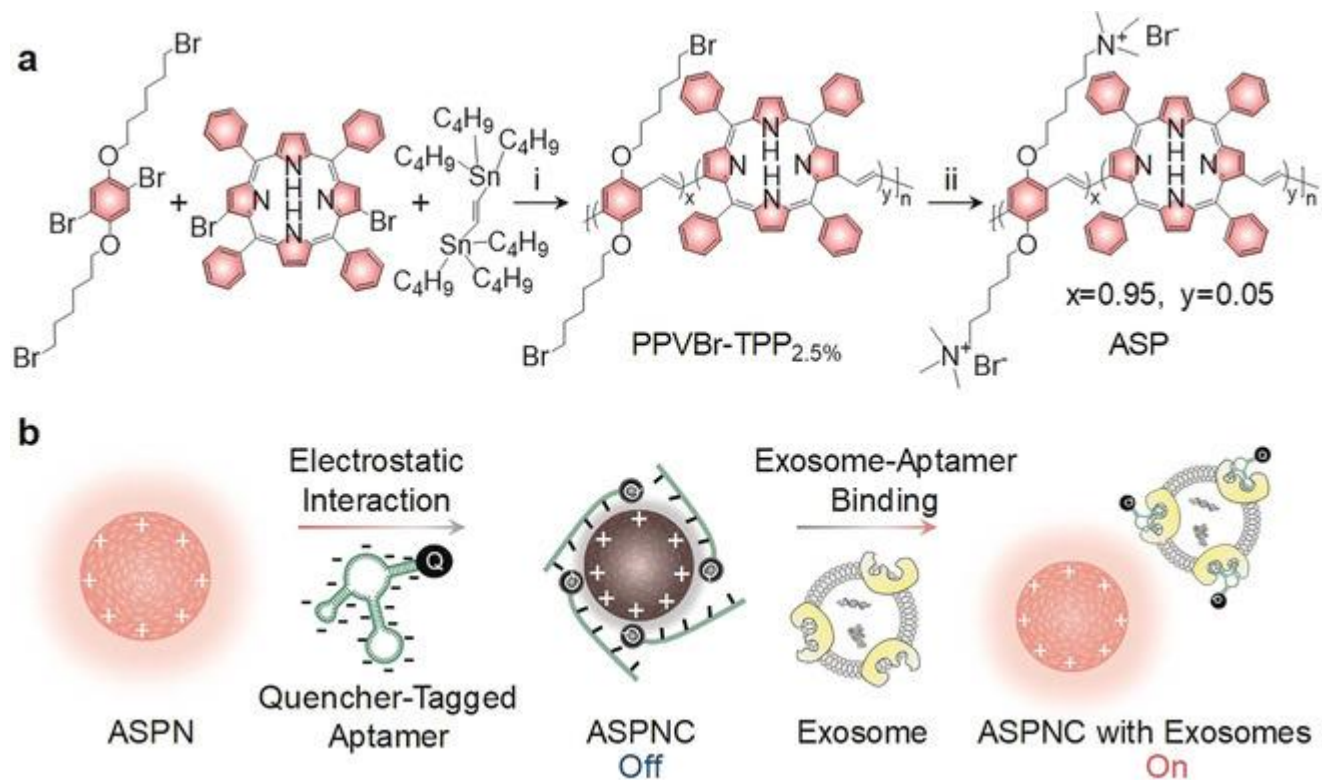
Introduction

Extracellular vesicles (EVs)

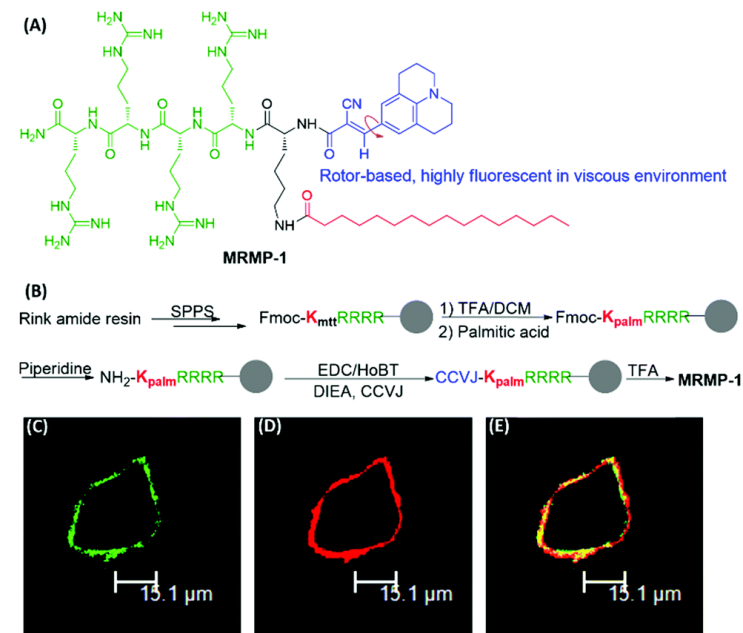


Introduction

Imaging of EVs



Chem. Commun., 2020, 56, 14869-14872



Angew. Chem., Int. Ed. 2019, 58 (15), 4983–4987

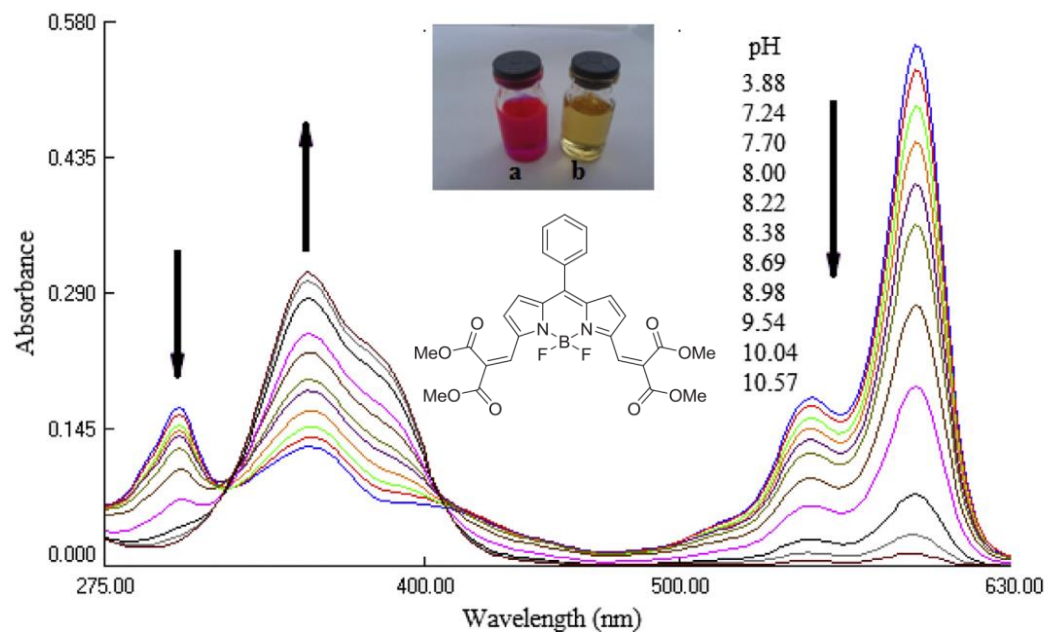
Chem. Commun., 2020, 56, 8480-8483

Introduction

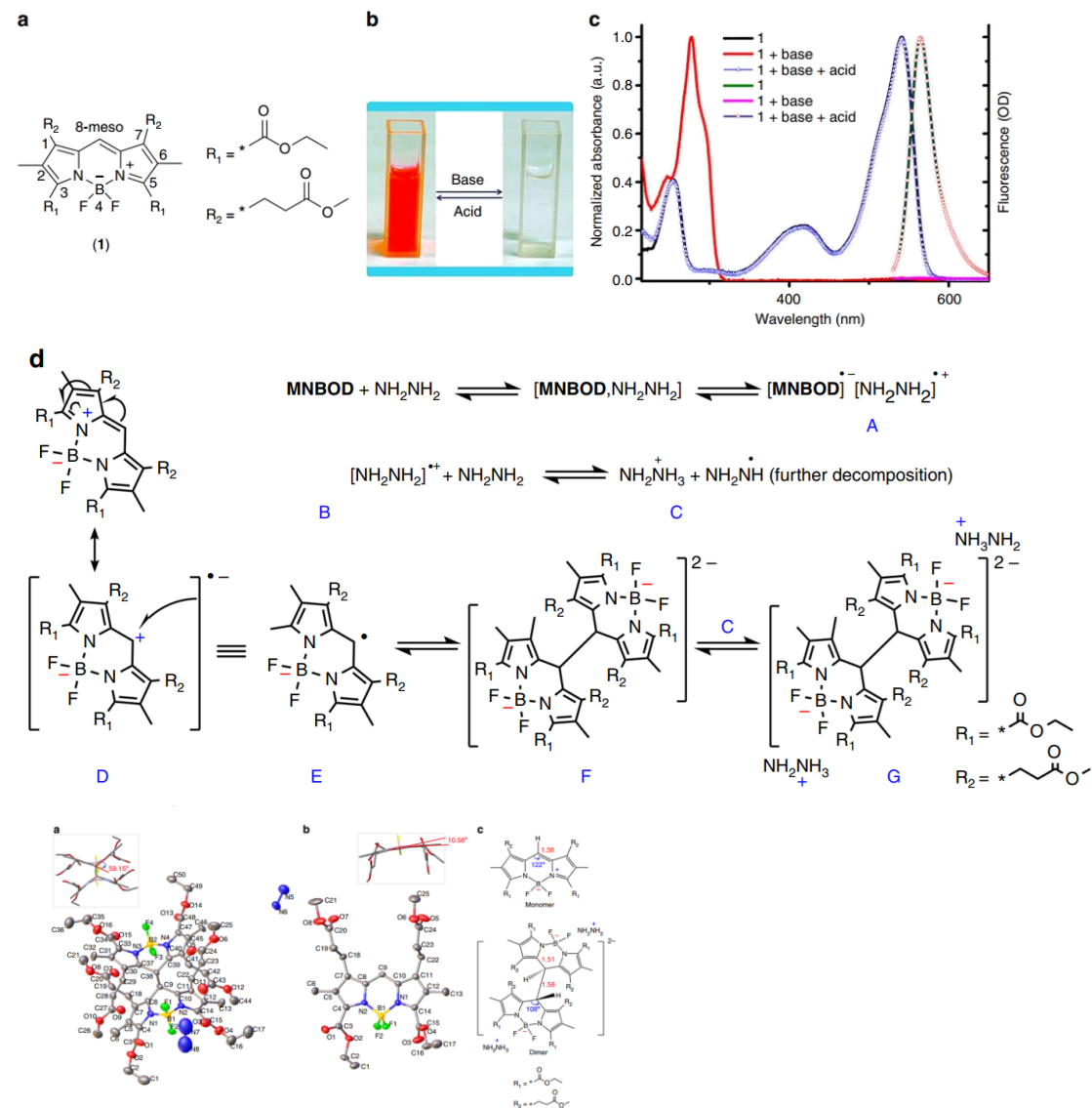
Reversible BODIPY and leuco-BODIPY

Optical properties of **1** in different solvents.

Solvent	λ_{abs} (max) (nm)	$\epsilon \times 10^4$ ($\text{M}^{-1} \text{cm}^{-1}$)	λ_{em} (max) (nm)	Stokes shift (nm)	ϕ_f
Toluene	598	9.80	611	13	0.45
Chloroform	598	10.45	609	11	0.54
Ethanol	592	9.80	603	11	0.77
Hexane	593	11.11	603	10	0.70
Acetonitrile	590	9.28	603	13	0.76

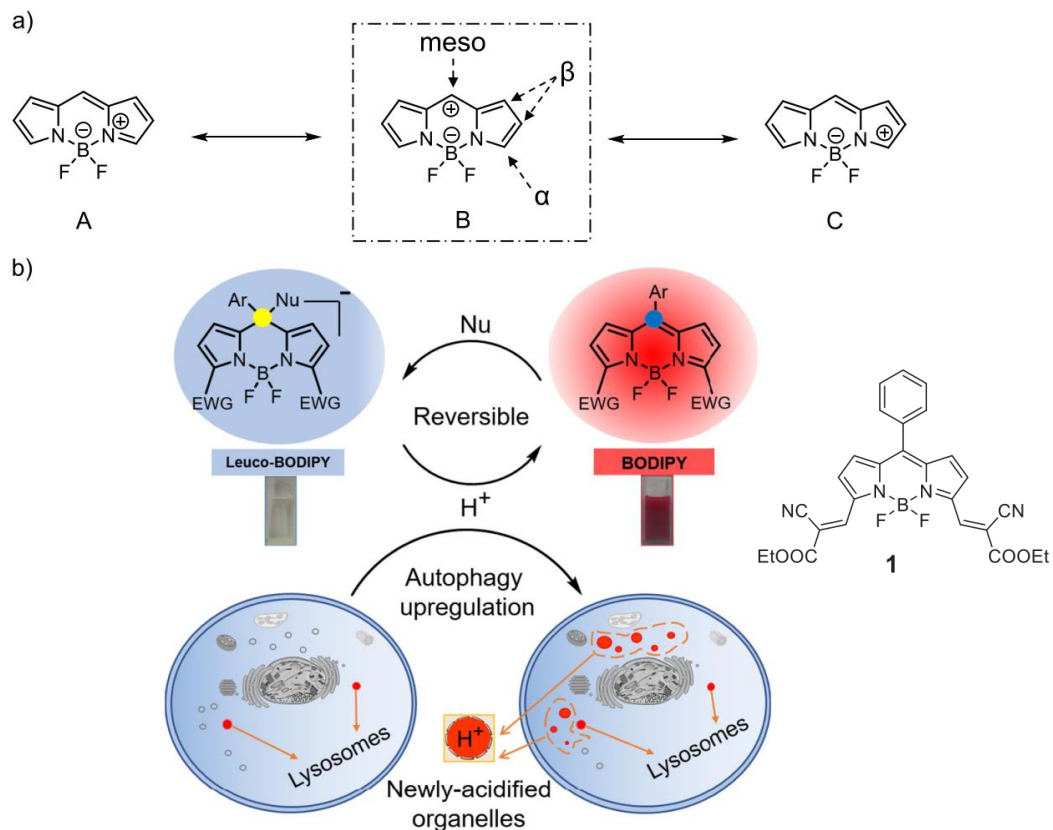


onset point at pH \sim 10



Introduction

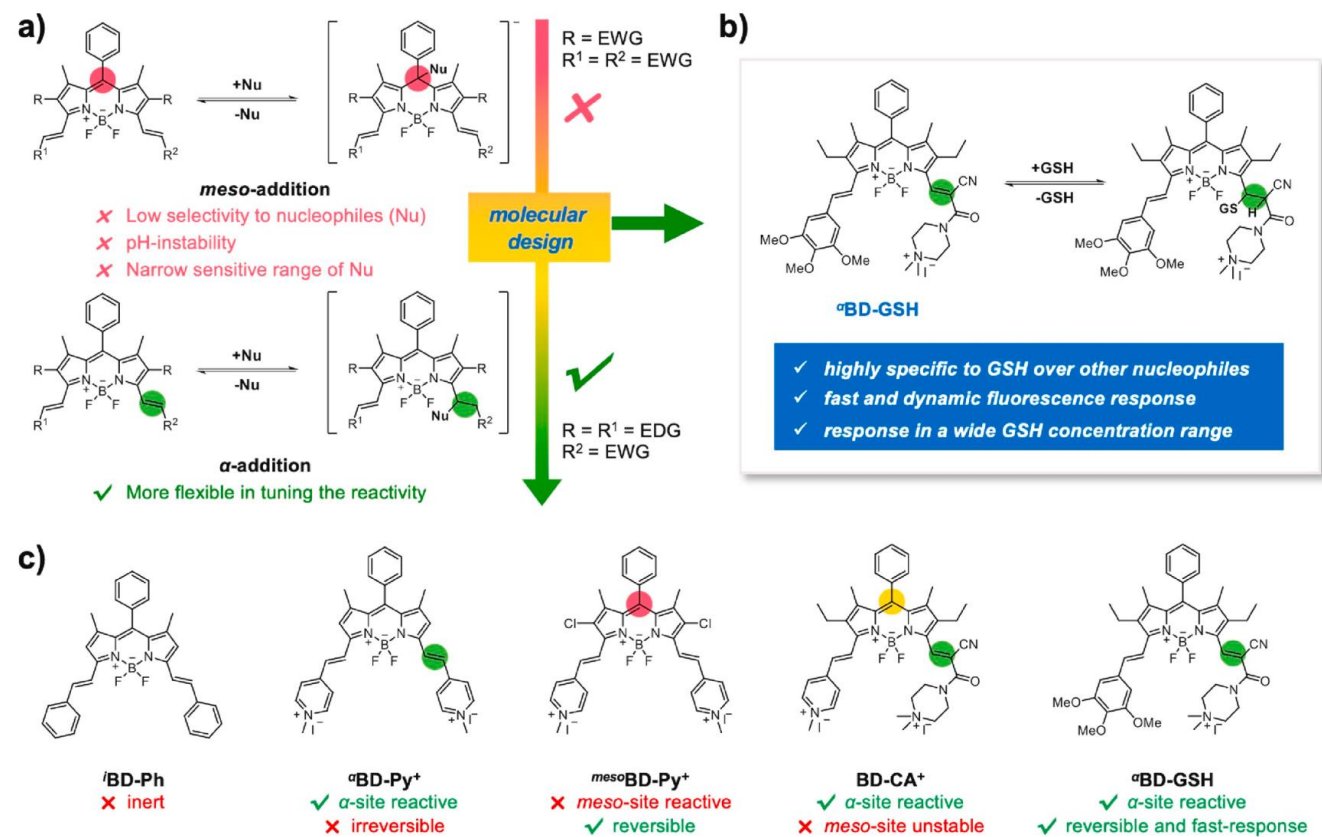
Reversible BODIPY and leuco-BODIPY



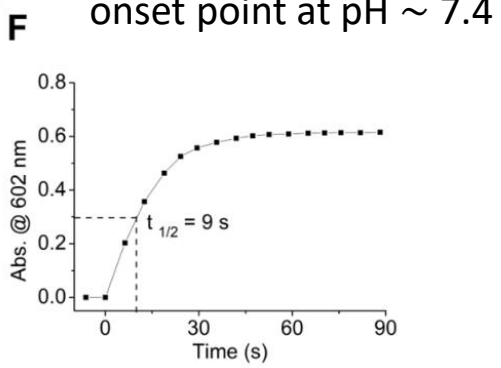
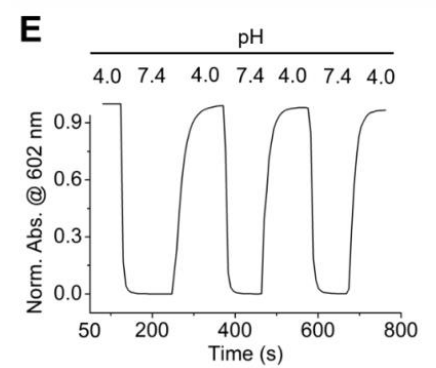
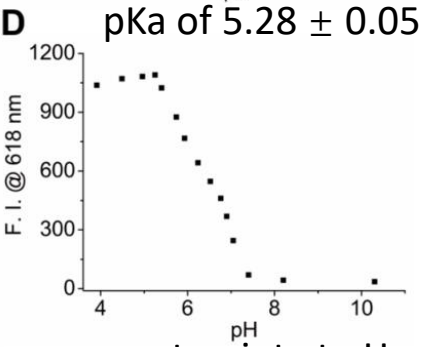
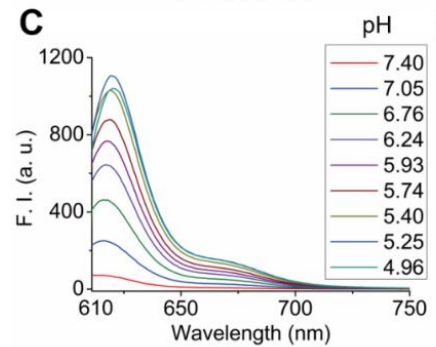
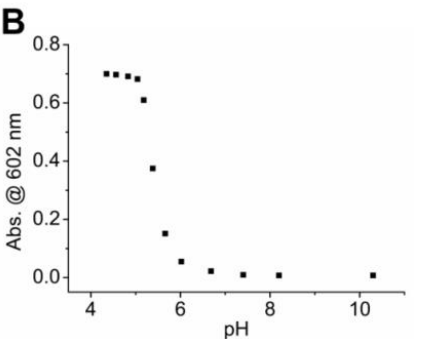
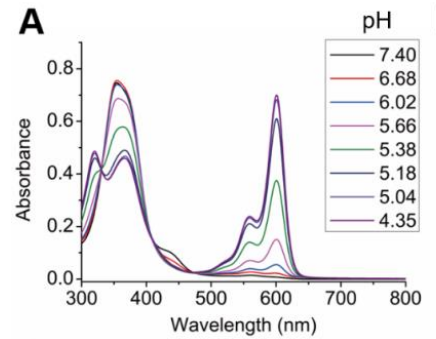
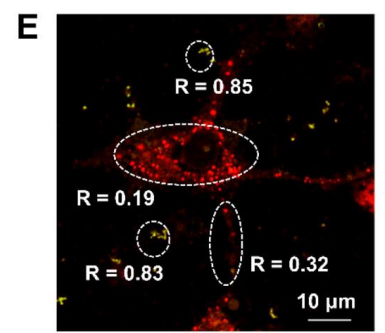
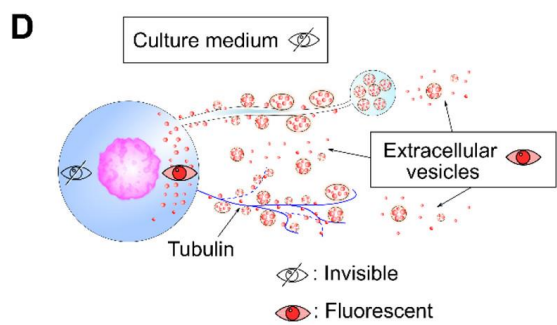
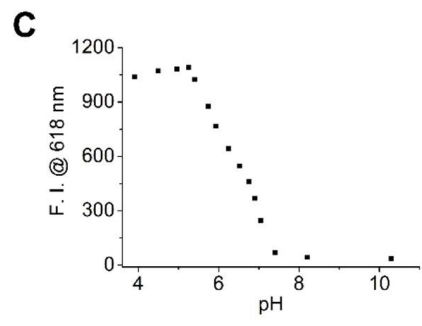
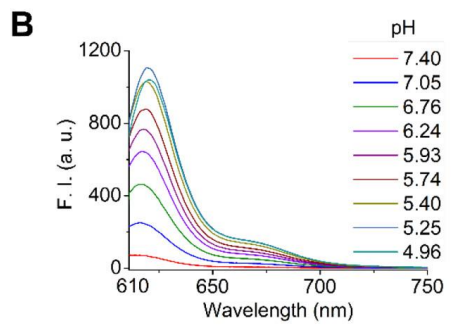
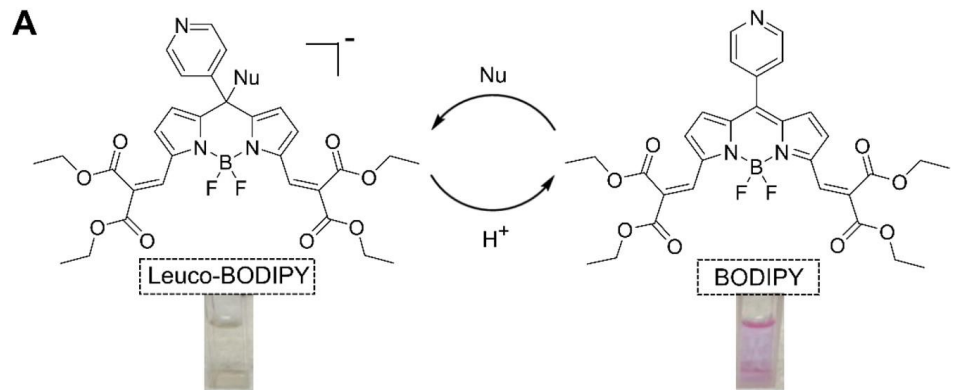
pKa 3.69

onset point at pH ~ 6

imaging the formation of acidified organelles during autophagy

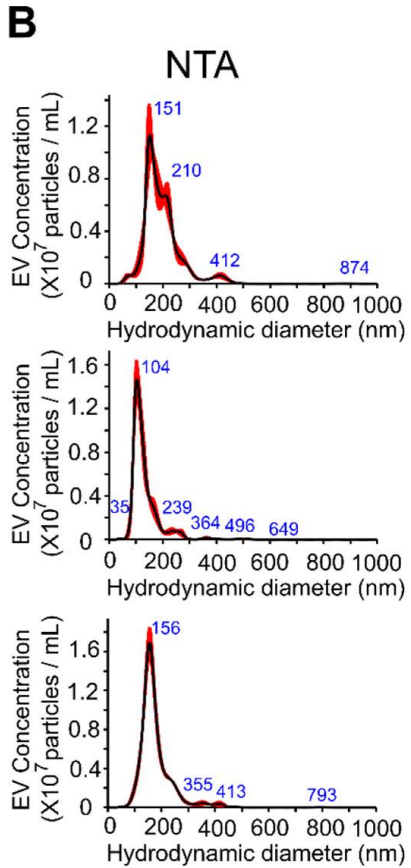
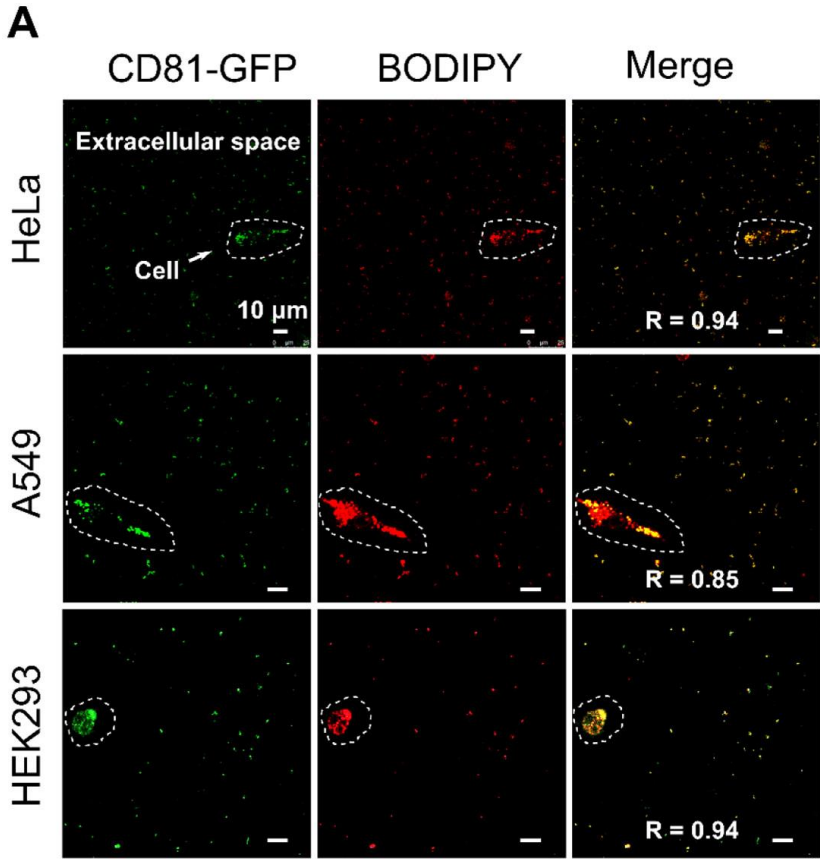
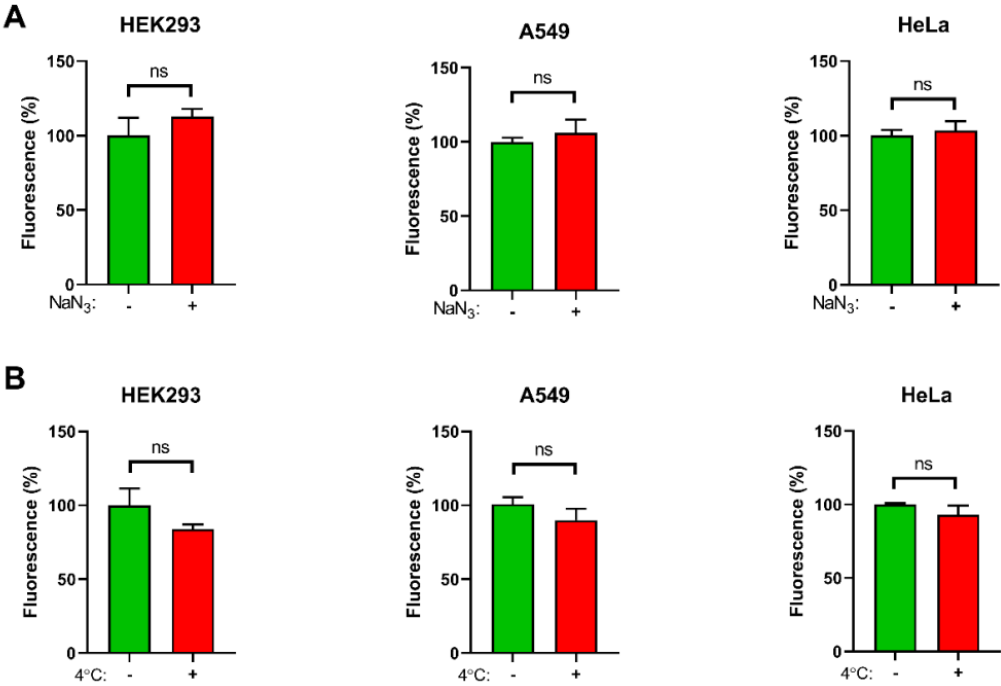


Molecular design and characterization



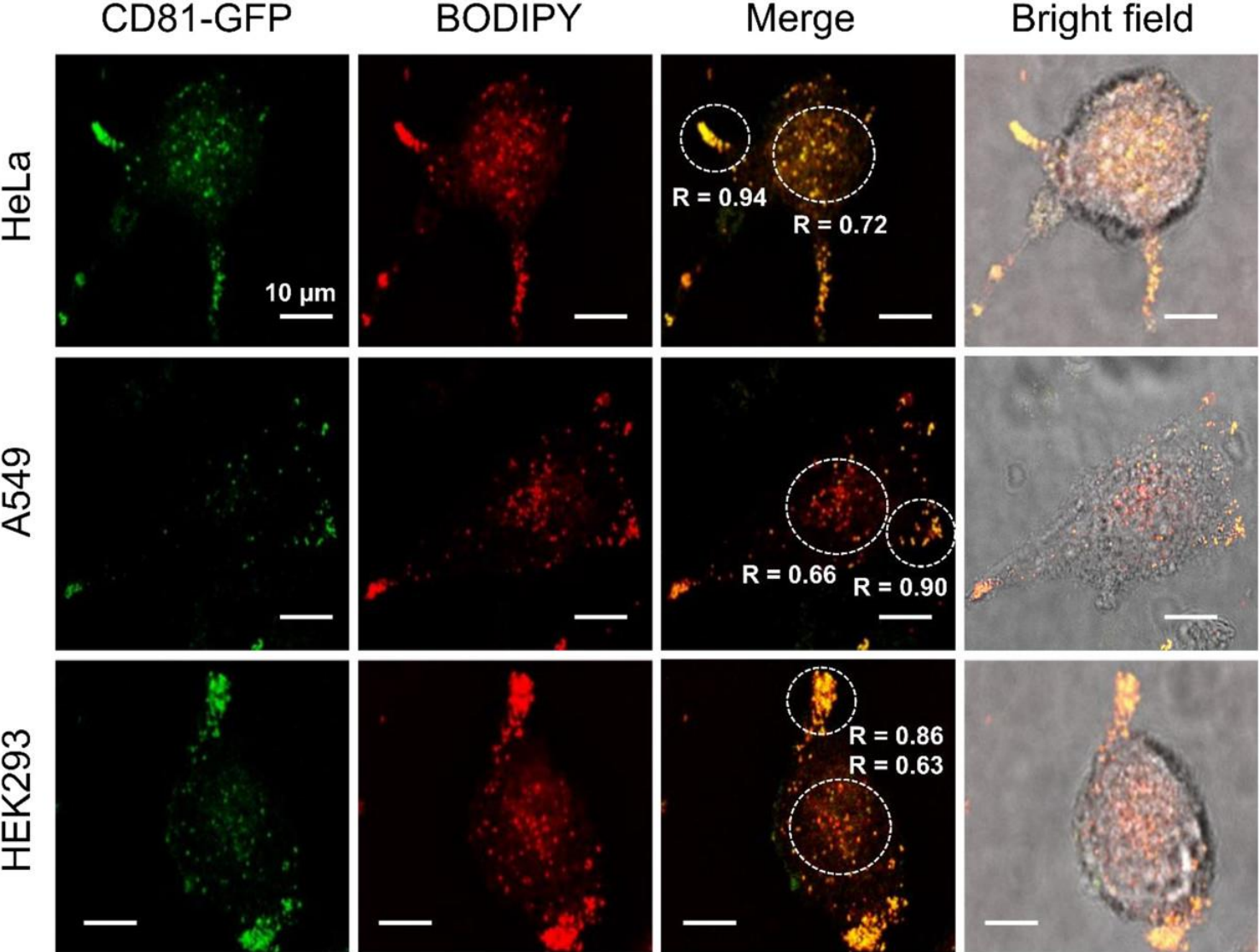
C2H5OH/PBS (1:1, v/v)

In situ detection of EVs secreted by cells to the culture medium

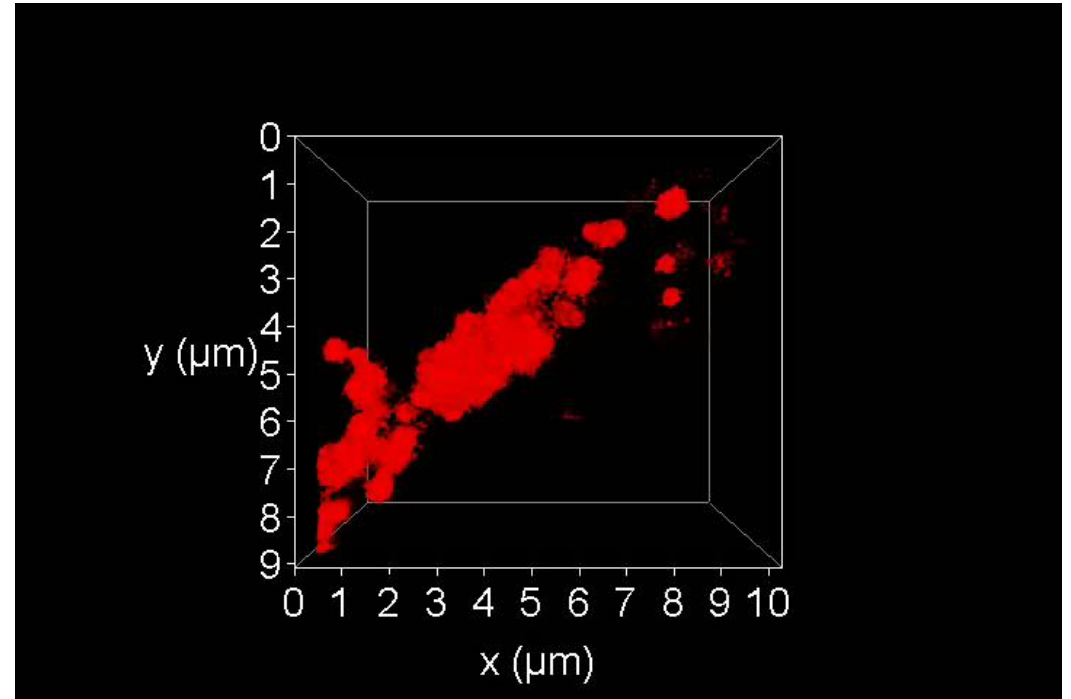
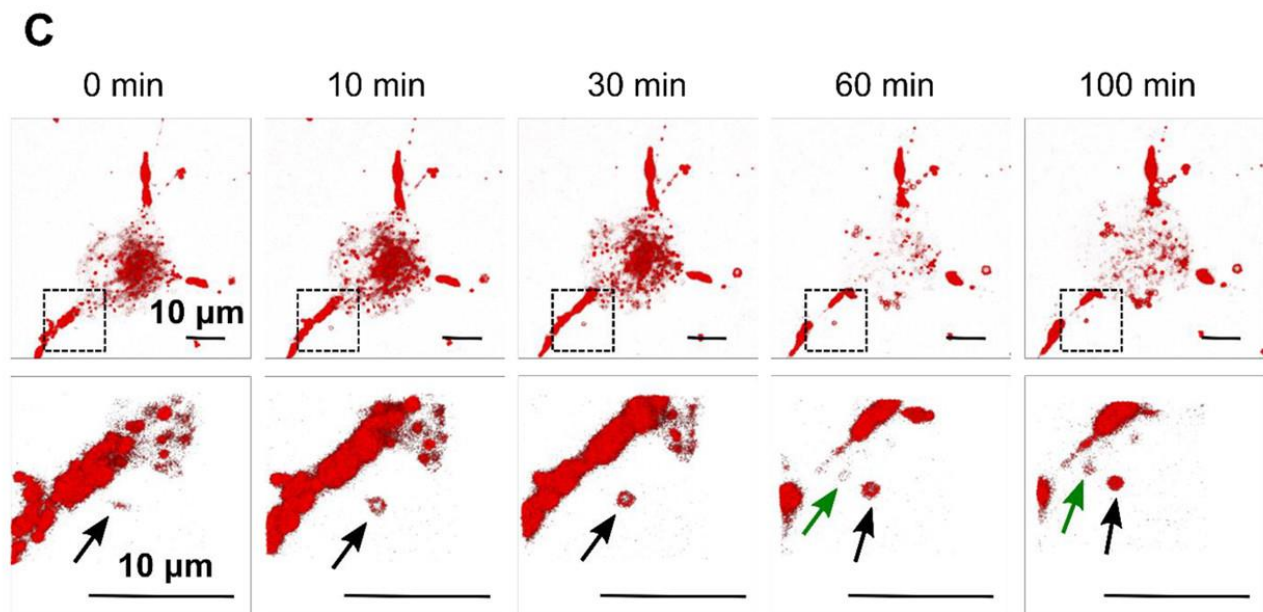
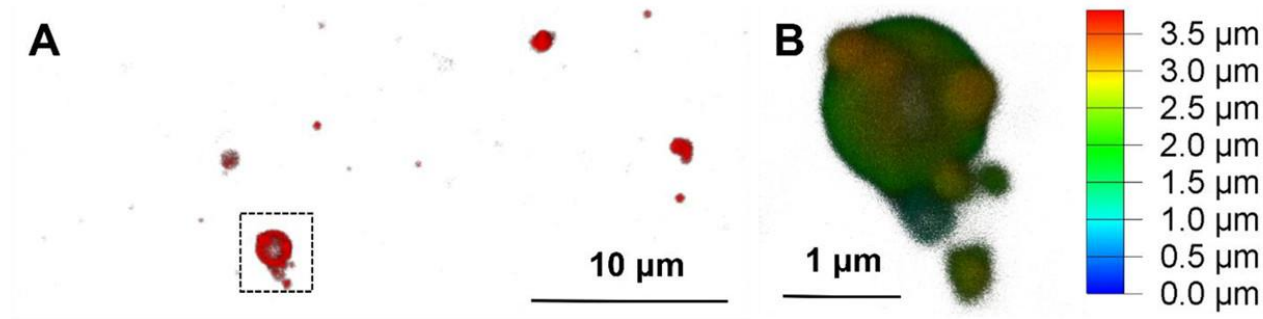


纳米粒子跟踪分析

Detection of intracellular precursor EVs

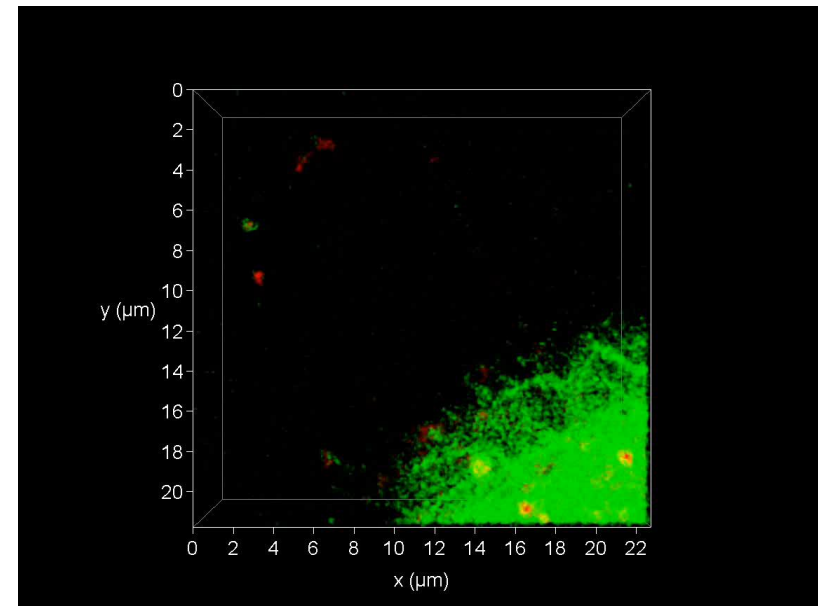
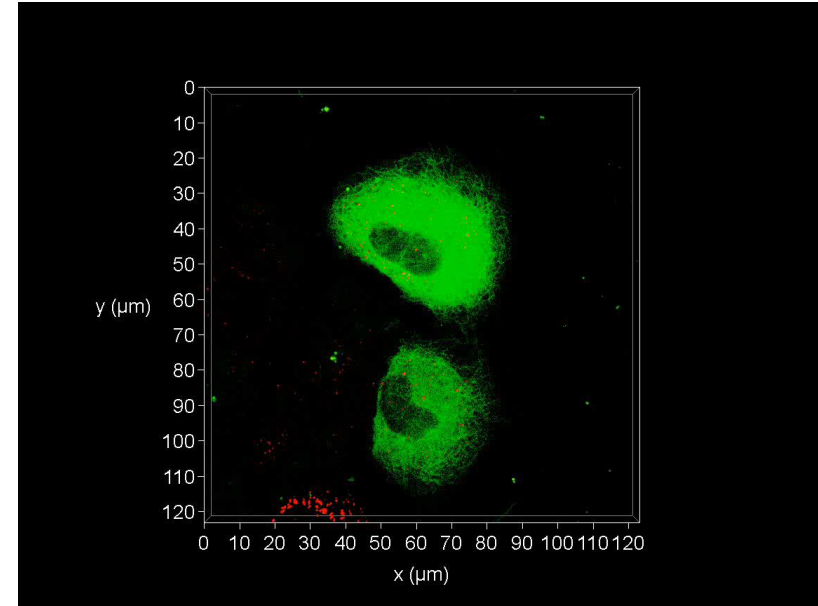
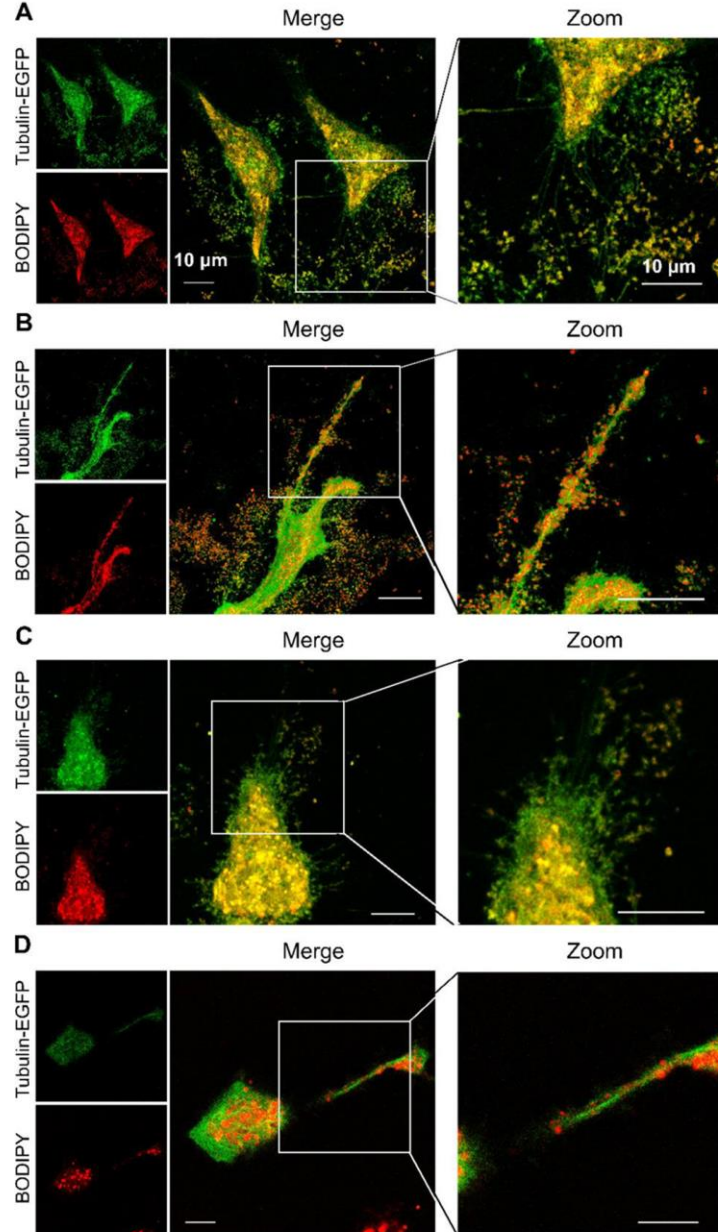


Visualizing extracellular multivesicular bodies in the medium

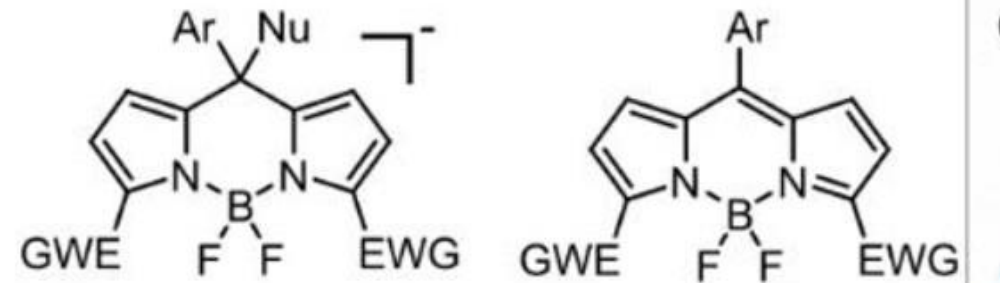


伪足可能参与了胞外囊泡的分泌

Transport of EVs along microtubules inside pseudopodia

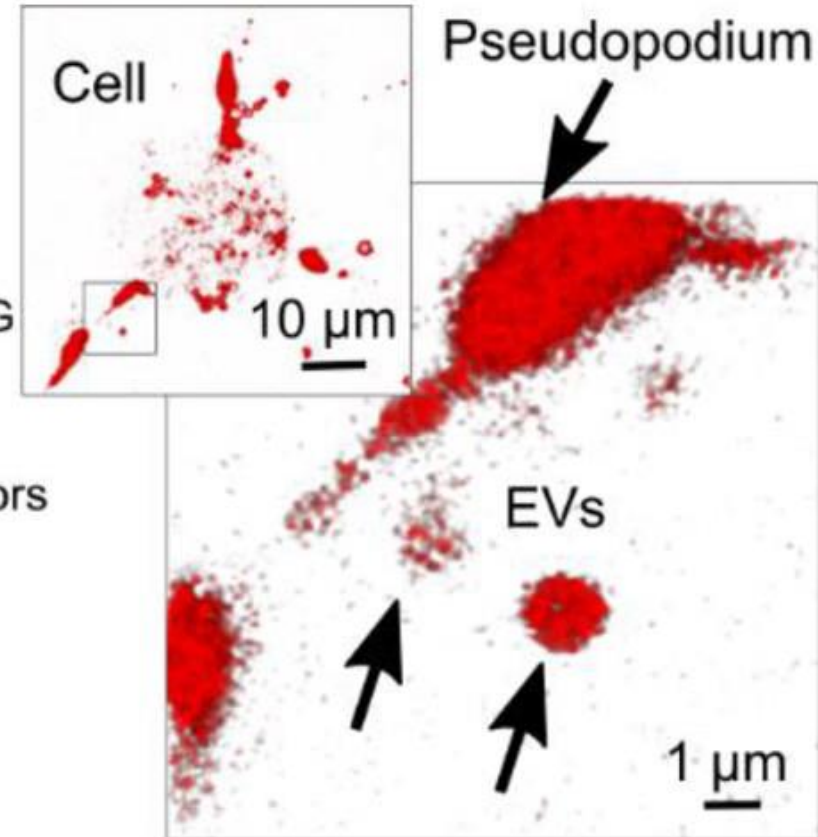
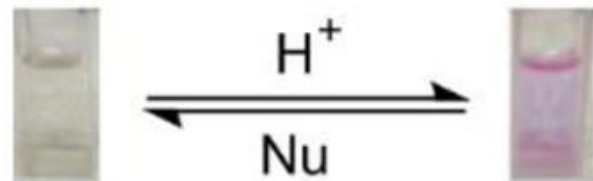


Summary



Leuco-BODIPY in
basic culture medium

BODIPY in acidic
EVs and the precursors



In situ imaging of the secretion of extracellular vesicles (EVs)